www.SeCosGmbH.com

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8F.No.33, Lane 155, Sec.3, Bei-Shen Rd.,
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Product/Process Change Notification

PCN#	Effective Date	Issue Date
2017-12-08C-01	2018/3/8	2017/12/8

PCN Classification	Product Category
Major	Transistor

Subject

Production process change from lead free to halogen free.

Affected Product(s)

SOT-723 Package of Transistor, Such as attachments.

Description of Change(s)

To meet EU environment requirement, we implement halogen free to our products.

Content of Change(s)

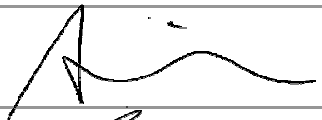
Adding “-C” to each part number.

Impact(s)

N/A

Attachment(s)

SGS report. Reliability report.

Approval		
Issue by	Alice Lai	e-mail: alice@secosgmbh.com
Development Engineer		Alice Lai
QA Manager		Peter Yang
General Manger		Mathew Liu

For more information, please contact us directly or visit our website http://www.secosgmbh.com

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Affected Product(s)

2SC5658
MMBT2222AM
MMBT3904M

SeCoS Corporation

Reliability Testing Summary Report

Date: 2017/11/30 Document No.: SK17 -11- 102

Test Item	P/N	Test Condition	(LTPD)	Sample Numbers	Allow Fall Numbers	Fall Numbers	Result
HTRB High Temp Reverse Bias	MMBT3904M-C	150℃ ± 5℃, 80%VR, T = 1000 hrs		77	0	0	ACC
HTSL High Temperature Storage Life	MMBT3904M-C	150℃, T = 1000 hrs		77	0	0	ACC
PCT Pressure Cooker Test	MMBT3904M-C	121℃, 29.7PSIG, 168 hrs		77	0	0	ACC
TCT Temperature Cycle Test	MMBT3904M-C	-55℃/30min, 150℃/30min, For 1000 Cycle		77	0	0	ACC
THT High Temperature High Humidity Test	MMBT3904M-C	85 ± 2℃, RH=85±5%, 1000 hrs		77	0	0	ACC
H3TRB High Temper High Humidity Reverse Bies Test	MMBT3904M-C	85 ± 2℃, RH=85±5%, 80%VR, 1000 hrs		77	0	0	ACC
Resistance to Solder Heat Test	MMBT3904M-C	270℃±5℃, 7Sec +2/-0Sec		77	0	0	ACC

Judgment:

■ **qualified** ☐ **unqualified**

Testing Start Date: 2017.10.05 Testing End Date: 2017.11.30

Tester: King Huang Approval: Peter Yang

SeCoS Corporation

Electrical Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 25℃
Test Date: 2017.10.05
Test Standard : Specifications
Operator: Leo Hsia

Test Result: PASS

No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	54.24V	203.5	124.3mV
2	55.35V	209.2	132.0mV
3	53.06V	193.8	123.8mV
4	55.50V	201.1	122.4mV
5	53.51V	220.0	132.6mV
6	55.40V	206.8	111.6mV
7	55.06V	214.3	134.3mV
8	53.73V	220.4	109.3mV
9	52.67V	202.1	124.5mV
10	55.40V	200.0	109.4mV
11	54.87V	208.5	110.8mV
12	54.42V	198.6	128.6mV
13	54.71V	217.7	114.1mV
14	52.44V	201.2	114.1mV
15	52.91V	203.0	112.5mV
16	54.30V	213.4	117.3mV
17	52.89V	194.4	116.1mV
18	55.47V	208.4	112.5mV
19	52.79V	206.2	111.4mV
20	53.01V	208.8	119.2mV
21	54.88V	213.6	115.7mV
22	54.75V	216.2	118.6mV
23	53.58V	199.4	119.1mV
24	55.04V	200.5	110.1mV
25	53.90V	213.0	130.3mV
26	52.94V	205.0	118.7mV
27	54.87V	216.1	122.8mV
28	53.04V	197.6	116.8mV
29	52.53V	197.6	124.7mV
30	54.61V	201.1	109.7mV

SeCoS Corporation

Electrical Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 25℃
Test Date: 2017.10.05
Test Standard : Specifications
Operator: Leo Hsia

Test Result: PASS

No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
31	53.72V	219.9	131.8mV
32	52.59V	220.8	124.3mV
33	54.60V	206.1	122.4mV
34	53.55V	209.8	134.4mV
35	55.44V	202.5	114.3mV
36	53.96V	209.0	122.2mV
37	53.36V	202.4	126.9mV
38	55.09V	213.9	129.7mV
39	53.07V	205.2	119.1mV
40	54.19V	193.1	123.6mV
41	55.04V	218.5	131.1mV
42	52.93V	194.1	129.8mV
43	52.61V	214.6	132.0mV
44	54.61V	214.9	132.2mV
45	55.18V	220.9	125.9mV
46	54.12V	213.3	126.2mV
47	54.90V	195.2	117.4mV
48	54.27V	210.3	121.6mV
49	54.70V	196.2	126.7mV
50	52.71V	197.8	119.8mV
51	52.48V	217.3	118.4mV
52	52.56V	211.0	112.5mV
53	53.87V	218.0	119.2mV
54	55.41V	198.7	131.7mV
55	54.02V	195.6	129.5mV
56	54.71V	207.1	125.6mV
57	53.44V	211.9	112.4mV
58	55.17V	196.2	113.7mV
59	55.29V	214.7	115.4mV
60	53.07V	208.2	126.0mV

SeCoS Corporation

Electrical Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 25℃
Test Date: 2017.10.05
Test Standard : Specifications
Operator: Leo Hsia

Test Result: PASS

No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
61	55.52V	199.7	130.5mV
62	53.68V	218.9	131.4mV
63	54.61V	196.6	123.9mV
64	54.40V	195.5	121.0mV
65	54.87V	206.4	116.3mV
66	55.68V	197.6	111.9mV
67	54.65V	217.8	124.4mV
68	55.60V	207.0	117.1mV
69	54.41V	215.4	110.9mV
70	54.30V	214.9	125.1mV
71	54.95V	206.7	118.6mV
72	54.14V	193.2	115.7mV
73	53.56V	205.4	121.5mV
74	53.69V	209.0	115.0mV
75	54.42V	196.6	125.9mV
76	53.10V	209.4	129.8mV
77	53.43V	207.3	114.9mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

High Temperature Reverse Bias Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 150℃ ± 5℃, 80%VR, T = 1000 hrs
Test Date: 2017.10.05 ~ 2017.11.17
Test Standard : JESD22 STANDARD Method-A108
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	55.12V	195.5	130.4mV	53.92V	209.1	122.4mV
2	53.98V	203.3	126.1mV	55.29V	192.6	127.1mV
3	52.40V	195.2	127.9mV	55.38V	209.1	127.2mV
4	55.01V	219.2	114.6mV	55.62V	200.4	115.2mV
5	53.29V	204.5	115.2mV	55.40V	217.1	131.4mV
6	53.98V	219.4	108.9mV	54.00V	219.0	119.6mV
7	54.91V	205.8	119.3mV	54.92V	215.6	126.7mV
8	53.09V	209.6	113.4mV	52.97V	205.3	108.5mV
9	53.68V	193.7	125.5mV	53.47V	212.4	126.4mV
10	52.78V	194.5	121.7mV	55.59V	218.4	124.3mV
11	53.61V	220.7	128.2mV	54.96V	212.2	113.0mV
12	53.64V	214.5	124.8mV	55.47V	209.9	109.3mV
13	55.60V	210.9	111.0mV	55.22V	204.9	126.9mV
14	55.08V	209.2	129.0mV	54.40V	213.2	128.1mV
15	54.95V	214.0	112.9mV	52.77V	201.2	131.7mV
16	53.97V	195.2	117.9mV	54.54V	209.1	120.8mV
17	54.20V	218.0	125.9mV	54.39V	206.5	118.4mV
18	55.37V	212.6	122.8mV	54.88V	194.4	112.7mV
19	52.79V	218.8	134.4mV	54.71V	202.6	131.1mV
20	52.83V	197.8	117.3mV	53.59V	193.7	113.6mV
21	53.86V	208.9	114.5mV	52.44V	217.0	134.3mV
22	54.65V	210.4	127.5mV	53.09V	201.9	111.6mV
23	53.60V	201.9	114.7mV	52.47V	199.7	112.4mV
24	54.37V	210.1	129.9mV	54.57V	209.6	118.8mV
25	54.37V	200.2	132.1mV	52.54V	204.0	126.6mV
26	54.44V	205.2	127.1mV	54.12V	209.4	127.2mV
27	54.78V	209.9	126.3mV	55.28V	205.6	123.8mV
28	52.96V	194.4	133.8mV	53.36V	192.8	128.6mV
29	55.28V	205.4	110.6mV	54.23V	218.0	110.1mV

SeCoS Corporation

High Temperature Reverse Bias Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 150℃ ± 5℃, 80%VR, T = 1000 hrs
Test Date: 2017.10.05 ~ 2017.11.17
Test Standard : JESD22 STANDARD Method-A108
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	55.11V	198.6	127.4mV	54.01V	196.9	114.2mV
31	53.36V	194.9	127.0mV	53.71V	196.2	108.9mV
32	53.00V	193.3	131.0mV	52.87V	218.5	131.2mV
33	54.04V	208.6	132.3mV	54.73V	202.7	108.5mV
34	54.33V	194.0	130.2mV	53.30V	206.6	129.0mV
35	55.53V	210.9	114.1mV	54.86V	200.2	128.2mV
36	55.47V	206.6	120.4mV	53.33V	208.6	133.3mV
37	53.40V	220.5	126.5mV	53.31V	207.8	112.0mV
38	53.64V	218.0	119.0mV	54.98V	200.5	122.7mV
39	53.85V	197.1	125.5mV	54.43V	220.2	120.6mV
40	55.66V	202.0	126.0mV	55.00V	217.1	132.4mV
41	52.81V	217.9	128.7mV	54.92V	197.0	125.0mV
42	54.70V	204.8	121.9mV	54.42V	208.1	127.8mV
43	54.53V	219.6	121.1mV	53.95V	207.9	133.1mV
44	53.62V	217.5	127.4mV	55.14V	195.3	116.8mV
45	53.72V	214.4	129.4mV	54.68V	219.5	125.3mV
46	55.56V	197.2	120.6mV	54.35V	200.1	119.6mV
47	52.80V	200.2	126.0mV	52.81V	196.4	127.5mV
48	54.47V	212.4	124.5mV	53.22V	205.7	121.6mV
49	52.94V	196.1	114.1mV	53.13V	212.0	117.9mV
50	54.52V	196.8	114.4mV	53.83V	216.0	129.9mV
51	52.52V	207.1	122.6mV	53.58V	193.0	118.3mV
52	54.19V	197.7	118.6mV	53.53V	215.7	126.9mV
53	54.37V	204.6	127.0mV	54.60V	212.0	110.3mV
54	55.07V	213.5	119.8mV	55.22V	196.0	118.7mV
55	54.38V	203.9	124.3mV	54.77V	194.6	127.4mV
56	54.25V	199.5	113.0mV	52.65V	218.0	127.3mV
57	53.21V	209.1	126.3mV	53.28V	197.1	132.4mV
58	54.78V	219.5	131.3mV	54.56V	194.3	126.1mV

SeCoS Corporation

High Temperature Reverse Bias Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 150℃ ± 5℃, 80%VR, T = 1000 hrs
Test Date: 2017.10.05 ~ 2017.11.17
Test Standard : JESD22 STANDARD Method-A108
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	52.80V	194.9	116.4mV	52.56V	212.6	119.3mV
60	54.81V	204.4	116.5mV	55.27V	214.3	133.8mV
61	55.62V	217.4	119.0mV	52.93V	197.3	109.2mV
62	53.77V	212.4	108.7mV	54.88V	216.2	128.0mV
63	54.49V	212.6	111.6mV	54.67V	210.5	121.8mV
64	53.25V	195.4	126.8mV	55.28V	206.1	123.4mV
65	52.88V	207.4	123.0mV	53.93V	203.2	119.8mV
66	55.59V	213.0	110.0mV	55.33V	196.8	120.3mV
67	55.44V	211.8	124.8mV	53.13V	193.6	116.5mV
68	54.95V	193.7	111.2mV	52.80V	193.4	109.7mV
69	53.98V	209.3	119.8mV	54.36V	220.4	118.5mV
70	53.20V	207.5	114.6mV	52.87V	210.1	118.6mV
71	53.92V	220.8	122.9mV	54.37V	193.2	131.5mV
72	53.02V	199.9	112.7mV	53.09V	200.7	115.1mV
73	54.13V	200.3	110.6mV	53.44V	203.3	109.6mV
74	55.34V	215.3	117.6mV	54.22V	215.3	111.7mV
75	53.40V	203.0	112.4mV	55.34V	217.7	130.4mV
76	54.98V	202.1	115.4mV	55.65V	198.8	112.5mV
77	52.42V	205.4	123.8mV	52.48V	201.2	110.0mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

High Temperature Storage Life Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 150℃, 1000Hrs
Test Date: 2017.10.05 ~ 2017.11.17
Test Standard : JESD22 STANDARD Method-A103
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	52.59V	220.3	119.0mV	53.17V	206.9	120.0mV
2	55.02V	218.0	130.4mV	53.70V	207.1	118.5mV
3	54.20V	203.8	128.0mV	55.45V	206.6	108.5mV
4	54.60V	194.8	122.9mV	52.49V	217.2	110.0mV
5	55.06V	209.3	110.9mV	53.47V	214.3	114.8mV
6	53.63V	204.3	111.5mV	55.65V	197.2	128.8mV
7	54.37V	217.2	128.5mV	54.16V	220.4	120.8mV
8	54.84V	212.9	126.4mV	54.55V	213.8	124.4mV
9	55.45V	216.8	121.6mV	54.73V	209.3	110.4mV
10	52.63V	213.2	124.0mV	53.43V	220.4	110.6mV
11	54.49V	203.8	120.0mV	55.54V	201.7	123.4mV
12	52.89V	220.4	120.0mV	53.51V	212.6	128.7mV
13	53.90V	202.2	126.1mV	52.97V	195.6	114.1mV
14	52.68V	212.3	117.0mV	54.13V	200.7	116.7mV
15	53.94V	197.4	127.7mV	55.00V	202.0	113.2mV
16	54.87V	219.7	126.1mV	52.80V	221.1	108.6mV
17	52.89V	220.1	116.6mV	52.98V	209.1	131.4mV
18	53.73V	193.0	133.4mV	55.13V	210.0	111.7mV
19	54.34V	209.6	118.5mV	53.01V	217.3	133.8mV
20	54.82V	219.8	129.5mV	55.27V	208.7	109.7mV
21	52.51V	193.4	119.2mV	55.64V	200.9	122.6mV
22	55.02V	199.6	116.0mV	53.01V	200.4	120.2mV
23	52.63V	207.5	129.9mV	54.73V	196.1	126.2mV
24	54.12V	212.1	109.5mV	54.65V	208.6	113.8mV
25	54.31V	199.5	127.0mV	53.34V	195.6	131.1mV
26	54.30V	207.8	120.3mV	53.29V	211.5	128.6mV
27	53.19V	212.0	116.4mV	52.54V	201.2	112.9mV
28	53.51V	219.4	128.6mV	55.46V	219.6	118.5mV
29	53.62V	218.6	123.0mV	54.55V	202.8	113.2mV

SeCoS Corporation

High Temperature Storage Life Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 150℃, 1000Hrs
Test Date: 2017.10.05 ~ 2017.11.17
Test Standard : JESD22 STANDARD Method-A103
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	53.37V	200.4	132.2mV	55.50V	203.9	116.4mV
31	53.63V	200.5	111.3mV	52.58V	202.8	117.0mV
32	55.62V	219.5	132.0mV	54.14V	220.6	125.7mV
33	53.74V	194.6	114.6mV	52.58V	202.8	114.0mV
34	52.61V	206.8	122.9mV	54.55V	196.8	112.6mV
35	54.66V	194.1	131.8mV	54.91V	192.6	131.9mV
36	55.31V	217.0	124.7mV	52.79V	208.5	121.9mV
37	54.44V	216.9	122.5mV	54.01V	219.8	110.0mV
38	53.68V	193.8	129.1mV	54.39V	208.8	109.6mV
39	53.46V	207.6	119.5mV	54.09V	207.1	112.0mV
40	54.91V	201.0	130.2mV	54.76V	200.9	124.5mV
41	54.69V	203.1	121.1mV	53.28V	213.0	110.3mV
42	55.16V	213.0	109.1mV	52.94V	204.1	133.6mV
43	53.25V	205.4	121.8mV	55.33V	216.4	115.7mV
44	54.13V	219.2	133.7mV	55.21V	213.9	131.7mV
45	54.97V	200.4	133.5mV	54.24V	201.3	132.8mV
46	53.92V	204.8	116.1mV	53.32V	206.7	120.1mV
47	55.03V	200.8	114.9mV	55.29V	211.4	123.2mV
48	55.47V	204.3	110.5mV	53.79V	216.8	115.2mV
49	52.65V	197.9	114.4mV	53.81V	208.0	124.5mV
50	52.67V	208.4	134.3mV	54.10V	220.8	119.7mV
51	53.16V	208.5	121.6mV	54.58V	219.9	117.9mV
52	54.12V	204.6	121.1mV	54.78V	208.5	129.1mV
53	52.59V	196.5	110.9mV	53.16V	201.6	126.9mV
54	53.69V	199.1	111.8mV	54.10V	215.5	118.6mV
55	54.41V	218.7	112.8mV	55.12V	213.4	132.4mV
56	54.85V	203.8	113.9mV	54.53V	208.2	114.0mV
57	55.33V	196.0	116.7mV	53.46V	206.6	127.3mV
58	55.23V	212.9	124.0mV	54.31V	214.7	129.9mV

SeCoS Corporation

High Temperature Storage Life Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 150℃, 1000Hrs
Test Date: 2017.10.05 ~ 2017.11.17
Test Standard : JESD22 STANDARD Method-A103
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	54.79V	201.4	127.3mV	54.62V	219.3	115.9mV
60	53.83V	198.3	114.7mV	53.93V	198.7	126.5mV
61	52.96V	209.4	125.6mV	53.11V	213.4	134.3mV
62	55.69V	216.1	111.5mV	53.30V	201.8	132.1mV
63	52.95V	211.1	120.2mV	53.09V	193.1	114.7mV
64	54.39V	197.7	120.8mV	55.70V	208.4	125.4mV
65	55.43V	216.1	122.6mV	55.48V	218.8	123.4mV
66	55.19V	199.1	131.9mV	53.69V	211.2	116.5mV
67	52.45V	217.6	128.9mV	53.42V	209.6	113.9mV
68	52.91V	208.6	119.3mV	55.46V	198.5	112.1mV
69	52.82V	215.1	115.5mV	54.56V	204.6	114.3mV
70	55.00V	216.4	130.7mV	52.41V	197.2	113.8mV
71	54.25V	205.6	131.2mV	55.21V	214.0	123.2mV
72	53.39V	204.5	128.0mV	53.99V	216.1	128.9mV
73	55.14V	200.3	134.3mV	53.19V	201.9	113.3mV
74	54.11V	199.4	127.0mV	55.04V	219.7	125.9mV
75	55.11V	216.5	113.1mV	54.75V	210.7	128.1mV
76	55.47V	204.7	123.1mV	54.45V	210.7	124.1mV
77	53.63V	220.9	109.5mV	54.78V	198.8	127.1mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

Pressure Cooker Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 121℃, 100%RH, 29.7PSIG, 168Hrs
Test Date: 2017.10.05 ~ 2017.10.13
Test Standard : JESD22 STANDARD Method-A102
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	53.20V	193.0	121.4mV	52.59V	202.4	129.7mV
2	53.73V	204.4	110.7mV	53.42V	213.1	117.1mV
3	53.10V	212.7	126.8mV	55.60V	213.7	124.6mV
4	53.87V	199.1	129.5mV	55.44V	207.7	110.2mV
5	55.25V	202.9	113.3mV	55.65V	216.8	121.1mV
6	53.68V	199.2	130.4mV	54.18V	205.4	117.4mV
7	55.63V	199.5	124.5mV	54.89V	194.4	111.8mV
8	54.92V	195.6	116.1mV	53.76V	198.9	130.4mV
9	54.53V	192.7	131.6mV	55.47V	218.1	132.5mV
10	55.38V	198.0	134.1mV	54.98V	204.2	120.3mV
11	55.60V	204.5	113.6mV	52.97V	197.8	119.3mV
12	54.94V	195.4	128.6mV	54.66V	195.3	112.2mV
13	55.40V	211.0	117.7mV	53.03V	194.2	108.5mV
14	54.84V	204.3	115.3mV	54.96V	219.6	120.4mV
15	55.21V	209.6	111.9mV	52.60V	203.8	127.6mV
16	54.11V	195.9	119.2mV	55.19V	195.4	126.8mV
17	53.05V	216.3	110.5mV	55.32V	219.2	117.4mV
18	54.17V	212.3	111.6mV	53.56V	210.0	132.5mV
19	54.81V	207.8	122.7mV	53.21V	192.9	121.5mV
20	53.07V	205.7	119.3mV	54.49V	201.3	110.0mV
21	55.09V	202.1	124.9mV	54.77V	215.2	116.1mV
22	54.12V	219.9	115.7mV	54.88V	205.7	112.6mV
23	54.41V	209.2	118.1mV	52.44V	202.1	116.8mV
24	53.62V	192.9	132.4mV	55.62V	215.9	133.0mV
25	55.32V	201.4	109.5mV	53.64V	213.6	131.1mV
26	53.06V	202.1	121.1mV	55.28V	215.2	117.4mV
27	55.49V	208.8	134.4mV	54.55V	213.0	132.8mV
28	55.33V	210.2	121.1mV	54.41V	201.1	122.4mV
29	53.37V	206.4	111.7mV	53.29V	211.4	117.4mV

SeCoS Corporation

Pressure Cooker Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 121℃, 100%RH, 29.7PSIG, 168Hrs
Test Date: 2017.10.05 ~ 2017.10.13
Test Standard : JESD22 STANDARD Method-A102
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	52.67V	202.1	119.5mV	53.65V	215.2	130.7mV
31	54.98V	197.6	111.8mV	53.87V	213.7	125.4mV
32	55.21V	205.8	109.5mV	54.85V	202.4	128.9mV
33	54.72V	196.0	118.4mV	55.22V	209.4	134.0mV
34	55.51V	200.6	109.1mV	54.35V	218.6	123.8mV
35	53.10V	219.9	117.6mV	52.49V	204.0	122.7mV
36	54.60V	194.6	115.8mV	55.34V	216.0	108.5mV
37	55.18V	208.7	133.2mV	55.67V	192.9	126.2mV
38	54.79V	216.4	130.1mV	54.77V	213.9	115.1mV
39	55.69V	217.7	113.0mV	53.66V	204.0	115.0mV
40	52.67V	201.2	108.4mV	55.69V	209.1	124.7mV
41	53.38V	204.5	123.9mV	54.88V	214.8	118.5mV
42	52.73V	208.4	124.3mV	53.79V	217.4	117.8mV
43	55.17V	204.2	113.0mV	54.65V	208.7	110.7mV
44	52.73V	209.7	108.9mV	54.54V	205.1	131.9mV
45	55.55V	221.1	123.6mV	55.19V	197.9	116.1mV
46	54.27V	195.6	129.7mV	55.29V	200.7	127.7mV
47	52.72V	217.8	117.3mV	54.27V	219.8	114.9mV
48	54.88V	213.2	114.3mV	53.69V	201.3	125.0mV
49	52.85V	213.8	117.5mV	54.60V	196.1	113.6mV
50	54.05V	193.5	109.4mV	53.44V	220.5	124.1mV
51	53.25V	199.6	118.4mV	55.47V	200.4	128.7mV
52	53.29V	201.9	125.3mV	53.01V	198.2	120.6mV
53	53.15V	202.6	126.1mV	55.50V	212.9	115.0mV
54	52.48V	219.6	121.1mV	53.17V	219.3	125.5mV
55	54.41V	204.5	123.7mV	53.59V	209.0	131.5mV
56	53.32V	204.9	126.1mV	52.73V	215.4	109.8mV
57	55.19V	197.9	127.3mV	55.17V	216.2	128.8mV
58	52.61V	196.4	113.6mV	54.62V	213.5	134.4mV

SeCoS Corporation

Pressure Cooker Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 121℃, 100%RH, 29.7PSIG, 168Hrs
Test Date: 2017.10.05 ~ 2017.10.13
Test Standard : JESD22 STANDARD Method-A102
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	54.15V	195.7	132.7mV	52.66V	201.6	123.9mV
60	53.54V	215.3	114.4mV	55.65V	202.1	121.3mV
61	55.31V	213.5	117.8mV	53.78V	201.6	110.7mV
62	54.91V	196.0	122.7mV	54.93V	192.5	116.3mV
63	55.22V	215.8	111.2mV	53.92V	212.4	118.4mV
64	54.24V	201.3	112.0mV	53.44V	192.7	123.6mV
65	52.93V	197.2	109.5mV	52.54V	192.6	119.1mV
66	52.49V	202.6	119.0mV	54.55V	199.4	121.3mV
67	55.56V	216.0	127.1mV	54.89V	198.6	124.1mV
68	53.13V	207.0	117.0mV	54.75V	196.0	125.0mV
69	54.45V	210.4	130.8mV	55.18V	204.0	125.3mV
70	52.96V	213.9	116.0mV	54.84V	194.6	114.1mV
71	53.89V	196.0	115.7mV	53.58V	198.9	128.6mV
72	54.79V	208.0	109.0mV	54.00V	199.2	125.6mV
73	54.06V	204.1	120.0mV	53.49V	216.3	111.6mV
74	53.04V	204.9	125.9mV	52.77V	202.9	133.6mV
75	53.08V	206.6	111.1mV	53.13V	204.9	134.1mV
76	54.95V	209.7	128.0mV	54.79V	202.3	126.7mV
77	54.68V	197.5	115.2mV	55.44V	211.1	112.9mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

Temperature Cycle Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: -55℃/30min, 150℃/30min, for1000 Cycle
Test Date: 2017.10.06 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A104
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	54.74V	216.3	127.1mV	54.57V	218.9	128.6mV
2	54.93V	215.0	131.9mV	52.93V	208.1	125.6mV
3	53.95V	218.3	115.9mV	54.73V	201.6	127.6mV
4	55.59V	215.0	123.7mV	53.05V	208.5	125.6mV
5	53.27V	194.0	110.6mV	54.82V	197.3	130.7mV
6	53.92V	217.7	113.9mV	54.83V	202.3	108.6mV
7	53.90V	196.1	110.2mV	53.66V	195.9	122.6mV
8	53.29V	217.1	121.2mV	53.65V	217.7	117.8mV
9	53.38V	196.5	130.8mV	55.54V	214.2	112.4mV
10	52.99V	202.5	111.8mV	54.20V	204.4	112.5mV
11	55.41V	202.9	111.7mV	55.08V	201.0	110.5mV
12	55.36V	212.1	126.3mV	54.85V	219.5	117.4mV
13	54.83V	205.2	118.4mV	52.89V	206.4	129.0mV
14	53.52V	192.7	124.7mV	52.73V	208.3	113.2mV
15	52.58V	194.8	114.5mV	53.44V	208.6	118.0mV
16	55.16V	201.9	113.8mV	54.87V	211.2	131.5mV
17	53.00V	196.6	109.1mV	53.66V	213.5	121.3mV
18	53.73V	211.8	132.3mV	53.93V	217.0	132.0mV
19	54.98V	215.1	112.0mV	54.55V	197.0	116.6mV
20	54.57V	219.1	115.2mV	53.75V	203.9	117.8mV
21	54.06V	199.9	113.0mV	53.46V	204.1	125.7mV
22	53.77V	198.9	130.0mV	52.53V	215.8	120.8mV
23	53.83V	201.1	116.0mV	55.38V	205.0	121.1mV
24	52.45V	220.0	111.3mV	54.45V	204.1	116.8mV
25	54.82V	214.1	109.5mV	55.65V	219.4	108.9mV
26	54.87V	202.3	112.0mV	52.49V	203.8	129.6mV
27	52.70V	194.2	120.0mV	54.36V	218.7	124.0mV
28	53.60V	218.3	109.5mV	53.03V	200.5	133.1mV
29	55.68V	200.9	130.0mV	53.76V	200.8	108.4mV

SeCoS Corporation

Temperature Cycle Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: -55℃/30min, 150℃/30min, for1000 Cycle
Test Date: 2017.10.06 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A104
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	54.71V	197.9	133.1mV	55.40V	212.8	131.1mV
31	55.38V	216.3	128.3mV	52.91V	213.4	133.4mV
32	54.08V	206.4	116.7mV	53.67V	219.0	118.7mV
33	54.25V	210.1	111.7mV	54.59V	207.3	122.8mV
34	52.72V	203.9	123.1mV	52.68V	196.5	131.5mV
35	55.58V	204.0	119.2mV	52.73V	220.9	116.7mV
36	53.62V	199.0	130.3mV	55.25V	218.2	116.8mV
37	53.23V	203.5	130.5mV	53.64V	216.3	114.1mV
38	53.34V	219.6	110.5mV	55.48V	202.6	123.4mV
39	52.62V	217.6	112.4mV	54.75V	215.7	115.2mV
40	54.35V	208.3	124.8mV	55.53V	216.5	115.1mV
41	55.08V	218.7	126.9mV	52.44V	194.1	121.7mV
42	52.84V	206.7	133.9mV	53.44V	198.6	128.2mV
43	53.07V	218.3	133.4mV	54.11V	213.2	116.7mV
44	53.99V	197.1	125.1mV	53.60V	199.4	133.0mV
45	53.16V	218.9	128.0mV	55.70V	210.4	115.6mV
46	52.59V	216.6	132.1mV	54.33V	209.6	113.1mV
47	53.07V	215.5	118.2mV	52.82V	207.9	119.5mV
48	54.02V	211.1	130.6mV	54.94V	214.8	127.4mV
49	54.75V	216.2	118.5mV	55.66V	200.6	120.7mV
50	55.33V	198.0	116.0mV	52.92V	208.3	126.3mV
51	53.65V	214.0	132.4mV	54.87V	207.8	113.0mV
52	53.57V	207.0	117.9mV	55.14V	203.2	113.0mV
53	54.85V	209.8	125.7mV	53.82V	192.9	109.8mV
54	55.15V	210.6	134.4mV	54.49V	202.6	119.8mV
55	52.44V	210.5	121.8mV	53.29V	215.7	109.9mV
56	54.61V	209.2	121.0mV	55.70V	193.2	128.7mV
57	53.63V	211.9	109.9mV	53.00V	205.5	134.0mV
58	53.05V	221.0	130.8mV	53.57V	199.4	131.4mV

SeCoS Corporation

Temperature Cycle Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: -55℃/30min, 150℃/30min, for1000 Cycle
Test Date: 2017.10.06 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A104
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	52.91V	215.6	126.8mV	55.01V	216.9	133.3mV
60	52.41V	206.7	122.3mV	53.38V	218.0	115.0mV
61	52.89V	219.3	122.6mV	53.60V	219.4	110.0mV
62	54.20V	210.8	133.8mV	53.81V	192.8	121.3mV
63	53.08V	196.2	133.2mV	53.18V	218.4	111.2mV
64	55.50V	211.3	114.9mV	55.67V	200.4	119.9mV
65	53.15V	192.6	130.2mV	55.30V	211.2	131.0mV
66	54.94V	209.9	128.3mV	54.35V	214.7	122.0mV
67	55.03V	212.0	129.1mV	54.17V	209.4	122.6mV
68	54.03V	215.0	119.3mV	52.68V	201.7	121.0mV
69	52.51V	202.7	117.2mV	54.47V	197.1	117.5mV
70	53.47V	202.1	117.5mV	55.29V	217.2	133.7mV
71	55.67V	194.4	123.2mV	53.48V	208.3	126.1mV
72	53.35V	211.1	118.3mV	55.55V	196.1	114.0mV
73	54.59V	200.6	111.4mV	54.87V	214.8	124.1mV
74	54.67V	210.8	115.0mV	53.21V	205.5	115.1mV
75	55.46V	194.7	123.3mV	53.90V	207.4	114.7mV
76	54.17V	202.6	112.2mV	54.70V	216.4	108.6mV
77	52.43V	208.3	127.8mV	52.63V	202.7	123.0mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

High Temperature High Humidity Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 85±2℃, 85±5%RH, 1000Hrs
Test Date: 2017.10.16 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A101
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	54.02V	204.3	130.2mV	54.90V	193.4	121.6mV
2	53.52V	215.8	116.9mV	52.69V	212.3	114.5mV
3	55.48V	204.9	114.6mV	53.03V	218.4	112.8mV
4	52.85V	219.6	119.2mV	53.23V	219.0	115.8mV
5	55.10V	218.3	121.8mV	55.69V	209.2	117.0mV
6	52.56V	199.4	130.9mV	53.30V	214.9	116.5mV
7	54.91V	200.6	120.8mV	52.76V	204.8	115.1mV
8	55.51V	203.6	129.9mV	53.48V	206.4	124.0mV
9	54.87V	214.3	115.1mV	53.21V	208.8	110.9mV
10	52.41V	217.9	128.0mV	55.00V	196.5	126.4mV
11	55.07V	215.1	110.7mV	55.14V	217.7	118.9mV
12	54.01V	194.9	122.6mV	54.07V	218.8	111.9mV
13	53.99V	212.8	108.9mV	52.90V	204.7	114.4mV
14	54.21V	193.0	131.3mV	54.26V	206.7	126.5mV
15	52.64V	204.2	128.1mV	55.24V	204.7	117.8mV
16	53.53V	218.9	117.0mV	54.61V	194.8	128.0mV
17	54.35V	194.9	123.6mV	52.45V	194.1	126.3mV
18	53.25V	206.4	116.1mV	54.33V	201.0	109.5mV
19	54.06V	193.4	113.5mV	53.75V	219.0	120.8mV
20	53.30V	206.5	120.7mV	54.70V	198.7	119.3mV
21	54.72V	208.2	119.8mV	53.07V	208.7	117.1mV
22	54.25V	215.3	118.1mV	53.31V	210.1	134.1mV
23	55.19V	218.2	123.9mV	55.30V	220.0	112.7mV
24	54.31V	210.9	133.7mV	53.99V	201.3	110.3mV
25	55.29V	205.1	134.4mV	53.90V	209.7	126.6mV
26	54.51V	194.2	120.3mV	55.30V	216.6	133.5mV
27	55.19V	200.0	126.8mV	53.66V	197.7	117.7mV
28	53.67V	218.9	122.7mV	53.10V	214.8	110.9mV
29	52.56V	198.9	129.8mV	54.29V	219.5	118.0mV

SeCoS Corporation

High Temperature High Humidity Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 85±2℃, 85±5%RH, 1000Hrs
Test Date: 2017.10.16 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A101
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	53.42V	201.8	109.2mV	53.89V	218.7	114.7mV
31	54.01V	218.9	118.4mV	52.63V	213.2	120.5mV
32	54.22V	209.5	112.0mV	55.00V	214.0	130.8mV
33	53.39V	207.0	133.6mV	53.36V	195.3	132.7mV
34	54.39V	212.1	111.5mV	52.79V	196.1	127.1mV
35	54.08V	200.4	117.6mV	54.78V	192.7	120.5mV
36	54.21V	192.6	118.9mV	54.13V	211.0	112.3mV
37	53.32V	194.1	125.6mV	53.90V	200.3	129.6mV
38	53.91V	218.6	119.9mV	52.97V	215.6	132.0mV
39	54.62V	206.4	109.4mV	53.46V	216.9	118.4mV
40	53.28V	200.5	115.0mV	55.13V	209.1	128.6mV
41	54.94V	213.0	117.9mV	53.94V	198.2	129.9mV
42	52.89V	216.2	126.4mV	54.28V	197.3	118.1mV
43	53.33V	200.8	133.2mV	54.87V	197.5	117.4mV
44	54.93V	202.1	119.5mV	52.92V	198.3	119.7mV
45	53.80V	193.3	122.6mV	53.16V	202.1	115.4mV
46	52.59V	206.7	123.6mV	53.33V	199.4	109.3mV
47	54.21V	213.6	133.6mV	52.82V	218.0	121.4mV
48	53.32V	193.7	116.5mV	54.72V	195.3	125.1mV
49	54.98V	210.4	122.2mV	54.98V	218.3	115.2mV
50	53.13V	195.6	120.4mV	55.23V	212.2	125.9mV
51	55.43V	193.9	112.4mV	55.30V	208.5	131.1mV
52	55.28V	218.8	116.6mV	52.66V	213.6	119.4mV
53	54.54V	218.9	124.8mV	54.49V	218.7	110.3mV
54	55.65V	208.6	111.9mV	54.72V	207.6	127.6mV
55	52.85V	196.9	119.4mV	52.92V	213.2	119.9mV
56	54.05V	209.4	122.9mV	55.28V	209.4	127.4mV
57	53.18V	219.5	127.4mV	55.05V	211.8	126.2mV
58	53.13V	204.3	111.7mV	53.77V	193.7	127.3mV

SeCoS Corporation

High Temperature High Humidity Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 85±2℃, 85±5%RH, 1000Hrs
Test Date: 2017.10.16 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A101
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	55.69V	216.8	130.3mV	52.89V	194.7	133.3mV
60	54.32V	203.2	109.6mV	54.48V	218.2	121.7mV
61	55.13V	201.8	133.6mV	54.83V	216.7	116.3mV
62	54.79V	203.4	119.8mV	53.66V	207.4	130.9mV
63	53.07V	213.6	126.0mV	53.30V	208.5	127.5mV
64	53.88V	199.8	117.1mV	53.34V	208.8	116.5mV
65	52.93V	197.1	113.6mV	55.44V	202.0	111.7mV
66	53.35V	218.6	111.1mV	53.60V	195.2	113.4mV
67	54.96V	219.4	116.4mV	55.41V	211.5	134.2mV
68	54.98V	208.0	113.1mV	52.59V	200.9	126.8mV
69	54.91V	207.6	125.2mV	54.76V	206.8	119.7mV
70	52.85V	219.8	127.3mV	54.61V	194.5	125.8mV
71	52.90V	218.4	115.9mV	53.32V	194.7	127.9mV
72	53.29V	212.8	120.4mV	53.26V	194.5	109.0mV
73	55.27V	193.8	114.9mV	55.15V	211.4	132.8mV
74	54.17V	209.2	110.4mV	55.44V	215.8	125.3mV
75	55.41V	211.4	122.9mV	54.94V	210.5	118.1mV
76	54.44V	217.1	111.4mV	55.23V	202.0	121.7mV
77	54.42V	204.7	124.7mV	53.94V	205.1	118.6mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

High Temper High Humidity Reverse Bies Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 85±2℃, 85±5%RH, 80%VR, 1000Hrs
Test Date: 2017.10.16 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A101
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	52.98V	216.0	126.0mV	55.20V	208.8	125.6mV
2	53.51V	210.8	121.5mV	55.16V	192.5	130.2mV
3	55.41V	207.5	121.1mV	54.11V	194.0	118.2mV
4	53.22V	193.6	114.4mV	55.60V	203.5	124.4mV
5	55.28V	209.8	116.7mV	52.77V	197.3	118.0mV
6	53.25V	203.0	126.6mV	55.03V	192.6	128.0mV
7	53.15V	206.9	133.4mV	53.76V	199.5	132.6mV
8	53.52V	217.8	118.8mV	52.48V	208.5	123.5mV
9	52.77V	219.7	110.4mV	53.31V	218.2	118.7mV
10	54.08V	214.9	128.7mV	53.81V	200.4	127.0mV
11	52.82V	197.0	130.5mV	53.74V	208.2	115.0mV
12	55.16V	214.6	111.8mV	54.90V	205.2	125.8mV
13	55.57V	198.1	111.9mV	55.32V	213.2	118.3mV
14	52.96V	204.4	114.4mV	55.65V	194.6	133.4mV
15	52.68V	194.3	129.7mV	53.31V	210.9	134.0mV
16	55.66V	216.1	133.9mV	54.00V	197.5	108.7mV
17	55.41V	205.1	120.3mV	54.51V	215.2	132.0mV
18	53.44V	202.6	122.9mV	52.59V	214.5	120.6mV
19	53.53V	221.1	121.1mV	53.60V	196.4	123.8mV
20	52.85V	211.9	119.3mV	55.11V	215.6	132.7mV
21	53.38V	211.7	118.7mV	54.75V	196.4	133.8mV
22	53.76V	211.8	122.5mV	53.76V	198.3	115.5mV
23	55.48V	208.9	119.5mV	53.13V	207.1	121.1mV
24	54.13V	207.6	117.4mV	54.62V	203.7	123.0mV
25	53.23V	201.1	132.0mV	54.80V	195.8	118.1mV
26	54.19V	194.8	112.4mV	54.03V	195.8	121.6mV
27	53.00V	209.5	122.1mV	53.68V	213.3	116.4mV
28	54.42V	218.3	118.3mV	54.73V	210.8	121.0mV
29	53.26V	214.5	110.6mV	52.68V	219.1	119.2mV

SeCoS Corporation

High Temper High Humidity Reverse Bies Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 85±2℃, 85±5%RH, 80%VR, 1000Hrs
Test Date: 2017.10.16 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A101
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	54.69V	217.2	124.8mV	52.44V	193.5	124.3mV
31	55.62V	199.3	117.2mV	54.37V	194.9	131.4mV
32	53.03V	216.4	114.5mV	55.41V	214.1	120.2mV
33	54.57V	199.0	133.4mV	54.33V	195.0	114.9mV
34	52.73V	215.2	133.5mV	54.97V	219.9	115.8mV
35	54.42V	220.6	118.0mV	53.01V	214.0	113.7mV
36	53.40V	214.1	119.6mV	54.61V	195.3	114.0mV
37	53.54V	206.0	115.8mV	54.04V	210.3	118.6mV
38	55.28V	216.5	130.2mV	54.26V	211.4	109.3mV
39	54.86V	210.6	109.6mV	54.25V	217.3	130.6mV
40	53.54V	213.3	117.3mV	53.94V	205.7	134.3mV
41	53.97V	208.4	130.8mV	54.32V	197.6	128.7mV
42	53.40V	199.8	120.4mV	52.73V	195.4	119.9mV
43	53.04V	209.4	112.2mV	55.46V	211.1	126.4mV
44	52.46V	198.2	129.2mV	52.47V	195.0	110.8mV
45	52.84V	204.3	119.9mV	53.62V	213.9	114.6mV
46	55.50V	201.1	133.7mV	54.87V	215.8	112.8mV
47	55.49V	212.3	132.3mV	54.97V	214.8	121.5mV
48	54.87V	211.5	131.8mV	52.72V	195.0	132.1mV
49	54.27V	220.3	114.7mV	55.12V	209.1	122.8mV
50	52.83V	207.1	121.3mV	53.33V	209.5	111.7mV
51	54.38V	216.4	110.7mV	54.97V	203.9	108.6mV
52	55.06V	209.5	123.5mV	55.68V	213.7	131.4mV
53	55.45V	194.1	115.4mV	54.12V	210.1	129.1mV
54	54.76V	200.8	110.7mV	53.20V	208.6	127.5mV
55	52.75V	218.8	109.0mV	52.60V	208.6	131.8mV
56	55.44V	193.5	119.3mV	55.16V	220.7	124.4mV
57	52.91V	215.5	127.5mV	54.73V	212.0	122.3mV
58	55.46V	193.5	134.4mV	53.83V	192.7	128.4mV

SeCoS Corporation

High Temper High Humidity Reverse Bies Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 85±2℃, 85±5%RH, 80%VR, 1000Hrs
Test Date: 2017.10.16 ~ 2017.11.28
Test Standard : JESD22 STANDARD Method-A101
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	54.51V	202.3	117.5mV	54.06V	218.2	125.6mV
60	52.73V	211.7	112.4mV	55.50V	214.2	114.7mV
61	52.83V	220.8	121.1mV	53.89V	215.5	117.3mV
62	52.81V	203.7	131.5mV	53.09V	202.2	124.3mV
63	53.85V	211.4	119.2mV	55.60V	201.9	118.8mV
64	53.94V	209.4	130.8mV	52.79V	199.2	133.3mV
65	55.62V	198.6	116.4mV	52.44V	194.7	125.8mV
66	52.42V	217.4	114.7mV	52.67V	212.1	119.1mV
67	53.00V	220.7	110.2mV	53.78V	214.3	133.0mV
68	55.49V	209.2	116.2mV	54.24V	210.1	119.4mV
69	55.30V	196.0	122.4mV	55.28V	195.0	132.3mV
70	55.13V	206.1	115.3mV	54.39V	193.7	119.0mV
71	52.44V	204.7	118.0mV	54.41V	202.0	131.5mV
72	54.00V	219.3	120.6mV	55.38V	202.9	118.1mV
73	54.48V	196.1	129.3mV	52.48V	195.3	116.9mV
74	54.12V	214.2	125.4mV	54.76V	198.8	133.0mV
75	52.82V	219.9	116.3mV	53.31V	200.9	134.4mV
76	54.25V	195.6	121.5mV	52.42V	213.6	116.9mV
77	52.55V	206.2	110.5mV	52.63V	206.8	113.0mV

Made By: King Huang

Approval: Peter Yang

SeCoS Corporation

Resistance to Solder Heat Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 270℃ ± 5℃, 7Sec + 2Sec/-0Sec
Test Date: 2017.11.29
Test Standard : JESD22 STANDARD Method-B106
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
1	53.42V	194.7	114.5mV	54.22V	192.6	131.0mV
2	55.40V	220.3	119.9mV	54.44V	202.8	112.5mV
3	54.87V	216.6	114.6mV	55.44V	206.6	133.6mV
4	54.87V	214.9	110.9mV	55.09V	210.7	114.8mV
5	53.00V	215.5	129.9mV	53.88V	204.9	110.6mV
6	53.95V	197.2	125.9mV	53.46V	198.9	124.3mV
7	53.34V	198.9	111.5mV	54.56V	199.5	123.9mV
8	54.75V	205.2	109.2mV	52.59V	203.7	118.2mV
9	54.90V	192.7	121.1mV	52.78V	199.5	121.3mV
10	54.24V	206.4	109.6mV	53.51V	220.8	114.9mV
11	52.62V	209.5	130.0mV	54.05V	210.6	119.5mV
12	55.24V	195.0	110.8mV	54.00V	219.6	128.2mV
13	55.62V	211.9	124.5mV	52.51V	220.8	119.3mV
14	54.28V	206.1	121.4mV	54.76V	213.7	124.2mV
15	52.70V	195.7	129.4mV	53.27V	220.6	115.5mV
16	55.02V	193.7	111.0mV	54.19V	201.3	115.4mV
17	54.76V	193.7	111.6mV	55.31V	216.2	124.1mV
18	53.30V	198.4	108.6mV	53.59V	210.6	109.4mV
19	53.21V	199.1	108.5mV	53.38V	213.4	128.3mV
20	53.22V	204.1	118.3mV	52.63V	216.9	120.8mV
21	54.02V	197.8	119.7mV	53.20V	195.5	108.9mV
22	52.51V	212.8	125.7mV	53.97V	205.3	108.6mV
23	53.64V	206.2	111.7mV	52.84V	216.6	111.1mV
24	54.27V	216.0	122.9mV	52.87V	212.0	121.4mV
25	55.38V	216.8	125.0mV	55.54V	195.9	120.5mV
26	54.44V	219.5	118.7mV	52.79V	200.7	121.9mV
27	53.44V	214.3	131.2mV	53.27V	196.9	130.9mV
28	54.14V	214.6	117.9mV	55.51V	215.3	120.8mV
29	55.66V	207.7	117.5mV	53.44V	197.2	130.3mV

SeCoS Corporation

Resistance to Solder Heat Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 270℃ ± 5℃, 7Sec + 2Sec/-0Sec
Test Date: 2017.11.29
Test Standard : JESD22 STANDARD Method-B106
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
30	53.65V	199.1	120.7mV	52.55V	203.2	113.1mV
31	52.60V	212.0	126.5mV	55.34V	218.2	132.9mV
32	55.60V	200.4	123.0mV	53.04V	198.5	121.4mV
33	53.17V	218.8	125.2mV	53.86V	206.5	129.7mV
34	52.63V	219.0	133.6mV	55.67V	216.6	132.4mV
35	54.64V	193.1	119.5mV	55.69V	216.2	126.4mV
36	53.67V	204.2	110.9mV	52.61V	220.1	129.4mV
37	52.52V	198.8	113.7mV	52.60V	209.8	110.9mV
38	53.18V	195.0	134.0mV	53.69V	209.6	127.3mV
39	53.91V	197.2	127.2mV	53.49V	198.1	127.3mV
40	55.59V	204.3	129.7mV	53.75V	208.4	123.8mV
41	55.00V	199.0	123.5mV	54.39V	207.4	122.3mV
42	54.11V	193.1	126.9mV	55.52V	206.0	121.5mV
43	55.22V	213.2	133.5mV	55.47V	212.8	131.2mV
44	54.82V	200.4	112.6mV	53.29V	198.5	111.4mV
45	53.40V	192.9	112.0mV	54.07V	193.6	120.2mV
46	55.41V	218.9	130.0mV	53.38V	208.2	111.2mV
47	53.37V	216.8	130.1mV	53.95V	221.0	110.1mV
48	54.67V	215.0	109.9mV	54.26V	207.0	118.7mV
49	55.22V	206.4	132.8mV	54.28V	212.6	129.6mV
50	55.36V	213.9	120.8mV	55.18V	207.9	125.6mV
51	52.80V	194.1	126.0mV	54.57V	197.3	123.2mV
52	53.05V	200.4	133.6mV	54.24V	205.2	124.4mV
53	54.08V	208.0	111.9mV	54.72V	209.6	132.0mV
54	55.57V	213.0	117.6mV	54.57V	217.6	120.9mV
55	52.83V	200.3	130.3mV	52.99V	196.7	108.6mV
56	53.35V	215.2	115.6mV	53.65V	214.2	117.8mV
57	53.48V	204.8	116.7mV	53.16V	213.4	112.8mV
58	54.73V	195.3	113.5mV	54.27V	217.2	122.1mV

SeCoS Corporation

Resistance to Solder Heat Test Data

Report No : T171130-102
Part No : MMBT3904M-C
Test Equipment: JUNO Test System DTS-1000
Test Condition : V(BR)CEO > 40V@IC=1mA, IB=0 ； 100 < hFE < 300@VCE=1V, IC=10mA
VCE(sat) < 300mV@IC=50mA, IB=5mA
Test Condition: 270℃ ± 5℃, 7Sec + 2Sec/-0Sec
Test Date: 2017.11.29
Test Standard : JESD22 STANDARD Method-B106
Operator: Leo Hsia

Test Result: PASS

	Before			After		
No	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)	$V_{(BR)CEO}$ (V)	h_{FE}	$V_{CE(sat)}$ (mV)
59	55.62V	218.4	129.6mV	54.35V	192.8	117.4mV
60	53.80V	218.8	113.3mV	53.11V	194.7	113.5mV
61	53.91V	216.5	125.6mV	55.15V	201.8	114.0mV
62	54.95V	198.5	110.1mV	54.87V	213.2	119.8mV
63	54.66V	220.1	123.4mV	53.48V	214.2	126.1mV
64	53.49V	211.5	131.9mV	54.93V	203.9	115.9mV
65	52.92V	199.5	109.8mV	54.32V	206.6	111.5mV
66	54.39V	197.0	127.5mV	53.36V	221.0	134.0mV
67	53.04V	219.0	116.1mV	55.30V	217.1	117.5mV
68	55.41V	197.2	115.8mV	52.43V	206.9	131.2mV
69	53.50V	212.9	120.9mV	54.45V	198.3	134.0mV
70	54.81V	206.1	132.3mV	54.11V	200.5	123.2mV
71	52.47V	195.7	126.8mV	53.26V	202.1	120.1mV
72	54.68V	197.4	131.9mV	53.24V	201.4	121.1mV
73	53.00V	218.0	115.6mV	52.72V	218.6	120.1mV
74	53.98V	214.6	127.5mV	54.84V	205.0	123.5mV
75	54.12V	211.0	128.5mV	54.51V	198.4	112.8mV
76	53.04V	198.1	115.3mV	55.36V	214.2	134.5mV
77	52.40V	193.6	130.6mV	52.59V	212.4	121.8mV

Made By: King Huang

Approval: Peter Yang

化學實驗室-高雄 Chemical Laboratory - Kao., SGS Taiwan Ltd.

試驗報告

號碼(No.) : KA/2017/61160 日期(Date) : 2017/06/15

Test Report

義典科技股份有限公司
E'DALE TECHNOLOGY CO., LTD.
72242 台南市佳里區六安里六安130號/江蘇省無錫市錫山區東港鎮錫港東路35號
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以下測試樣品係由申請廠商所提供及確認 (The following sample(s) was/were submitted and identified by/on behalf of the applicant as)：

樣品名稱(Sample Description)	:	EPOXY MOLDING COMPOUND
樣品型號(Style/Item No.)	:	ELER-8-SERIES
收件日期(Sample Receiving Date)	:	2017/06/13
測試期間(Testing Period)	:	2017/06/13 TO 2017/06/15
送樣廠商(Sample Submitted By)	:	義典科技股份有限公司 (E'DALE TECHNOLOGY CO., LTD.)

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測試需求(Test Requested) :

(1) 依據客户指定，參考RoHS2011/65/EU Annex II及其修訂指令(EU) 2015/863測試鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP. (As specified by client, with reference to RoHS 2011/65/EU Annex II and amending Directive (EU) 2015/863 to determine Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP contents in the submitted sample.)

(2) 其他測試項目請見下一頁 . (Please refer to next pages for the other item(s).)

測試結果(Test Results) : 請見下一頁 (Please refer to next pages).

結　論(Conclusion) :

(1) 根據客户所提供的樣品，其鎘、鉛、汞、六價鉻、多溴聯苯、多溴聯苯醚, DBP, BBP, DEHP, DIBP的測試結果符合RoHS指令暨(EU) 2015/863之限值要求. (Based on the performed tests on submitted samples, the test results of Cadmium, Lead, Mercury, Cr(VI), PBBs, PBDEs, DBP, BBP, DEHP, DIBP comply with the limits as set by RoHS and amending Directive (EU) 2015/863.)

報告簽署人/Ray Chang, Ph.D./Manager -Tech
Signed for and on behalf of
SGS Taiwan Limited

試驗報告

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測試結果(Test Results)

測試部位(PART NAME)No.1 : 黑色 EPOXY MOLDING COMPOUND
(BLACK EPOXY MOLDING COMPOUND)

測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測極限值 (MDL)	結果 (Result) No.1	限值 (Limit)
鎘 / Cadmium (Cd)	mg/kg	參考IEC 62321-5:2013方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-5:2013 and performed by ICP-AES.	2	n.d.	100
鉛 / Lead (Pb)	mg/kg	參考IEC 62321-5:2013方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-5:2013 and performed by ICP-AES.	2	n.d.	1000
汞 / Mercury (Hg)	mg/kg	參考IEC 62321-4:2013方法, 以感應耦合電漿原子發射光譜儀檢測. / With reference to IEC 62321-4:2013 and performed by ICP-AES.	2	n.d.	1000
六價鉻 / Hexavalent Chromium Cr(VI)	mg/kg	參考IEC 62321-7-2:2017，以UV-VIS檢測. / With reference to IEC 62321-7-2:2017 and performed by UV-VIS.	8	n.d.	1000

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測極限值 (MDL)	結果 (Result) No.1	限值 (Limit)
多溴聯苯總和 / Sum of PBBs	mg/kg	參考IEC 62321-6: 2015方法, 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6: 2015 and performed by GC/MS.	-	n.d.	1000
一溴聯苯 / Monobromobiphenyl	mg/kg		5	n.d.	-
二溴聯苯 / Dibromobiphenyl	mg/kg		5	n.d.	-
三溴聯苯 / Tribromobiphenyl	mg/kg		5	n.d.	-
四溴聯苯 / Tetrabromobiphenyl	mg/kg		5	n.d.	-
五溴聯苯 / Pentabromobiphenyl	mg/kg		5	n.d.	-
六溴聯苯 / Hexabromobiphenyl	mg/kg		5	n.d.	-
七溴聯苯 / Heptabromobiphenyl	mg/kg		5	n.d.	-
八溴聯苯 / Octabromobiphenyl	mg/kg		5	n.d.	-
九溴聯苯 / Nonabromobiphenyl	mg/kg		5	n.d.	-
十溴聯苯 / Decabromobiphenyl	mg/kg		5	n.d.	-
多溴聯苯醚總和 / Sum of PBDEs	mg/kg	參考IEC 62321-6: 2015方法, 以氣相層析/質譜儀檢測. / With reference to IEC 62321-6: 2015 and performed by GC/MS.	-	n.d.	1000
一溴聯苯醚 / Monobromodiphenyl ether	mg/kg		5	n.d.	-
二溴聯苯醚 / Dibromodiphenyl ether	mg/kg		5	n.d.	-
三溴聯苯醚 / Tribromodiphenyl ether	mg/kg		5	n.d.	-
四溴聯苯醚 / Tetrabromodiphenyl ether	mg/kg		5	n.d.	-
五溴聯苯醚 / Pentabromodiphenyl ether	mg/kg		5	n.d.	-
六溴聯苯醚 / Hexabromodiphenyl ether	mg/kg		5	n.d.	-
七溴聯苯醚 / Heptabromodiphenyl ether	mg/kg		5	n.d.	-
八溴聯苯醚 / Octabromodiphenyl ether	mg/kg		5	n.d.	-
九溴聯苯醚 / Nonabromodiphenyl ether	mg/kg		5	n.d.	-
十溴聯苯醚 / Decabromodiphenyl ether	mg/kg		5	n.d.	-

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測極限值 (MDL)	結果 (Result) No.1	限值 (Limit)
鄰苯二甲酸二異丁酯 / DIBP (Di-isobutyl phthalate) (CAS No.: 84-69-5)	mg/kg	參考IEC 62321-8:2017, 以氣相層析儀/質譜儀檢測. / With reference to IEC 62321-8:2017. Analysis was performed by GC/MS.	50	n.d.	1000
鄰苯二甲酸丁苯甲酯 / BBP (Butyl Benzyl phthalate) (CAS No.: 85-68-7)	mg/kg		50	n.d.	1000
鄰苯二甲酸二丁酯 / DBP (Dibutyl phthalate) (CAS No.: 84-74-2)	mg/kg		50	n.d.	1000
鄰苯二甲酸二 (2-乙基己基)酯 / DEHP (Di- (2-ethylhexyl) phthalate) (CAS No.: 117-81-7)	mg/kg		50	n.d.	1000
鄰苯二甲酸二異癸酯 / DIDP (Di-isodecyl phthalate) (CAS No.: 26761-40-0, 68515-49-1)	mg/kg		50	n.d.	-
鄰苯二甲酸二異壬酯 / DINP (Di-isononyl phthalate) (CAS No.: 28553-12-0, 68515-48-0)	mg/kg		50	n.d.	-
鄰苯二甲酸二正辛酯 / DNOP (Di-n-octyl phthalate) (CAS No.: 117-84-0)	mg/kg		50	n.d.	-
鄰苯二甲酸二(2-甲氧基乙基)酯 / DMEP (Bis (2-methoxyethyl) phthalate) (CAS No.: 117-82-8)	mg/kg		50	n.d.	-
鄰苯二甲酸二正戊酯/ DNPP(Di-n-pentyl phthalate) (CAS No.: 131-18-0)	mg/kg		50	n.d.	-
鄰苯二甲酸二己酯 / DNHP (Di-n-hexyl phthalate) (CAS No.: 84-75-3)	mg/kg		50	n.d.	-

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測極限值 (MDL)	結果 (Result) No.1	限值 (Limit)
銻 / Antimony (Sb)	mg/kg	參考US EPA 3052方法，用感應藕合電漿原子發射光譜儀檢測銻含量. / With reference to US EPA Method 3052 for Antimony Content. Analysis was performed by ICP-AES.	2	n.d.	-
鈹 / Beryllium (Be)	mg/kg	參考US EPA 3052方法，用感應藕合電漿原子發射光譜儀檢測鈹含量. / With reference to US EPA Method 3052 for Beryllium Content. Analysis was performed by ICP-AES.	2	n.d.	-
砷 / Arsenic (As)	mg/kg	參考US EPA 3052方法，用感應藕合電漿原子發射光譜儀檢測砷含量. / With reference to US EPA Method 3052 for Arsenic Content. Analysis was performed by ICP-AES.	2	n.d.	-
磷 / Phosphorus (P)	mg/kg	參考US EPA 3052方法，用感應藕合電漿原子發射光譜儀檢測磷含量. / With reference to US EPA Method 3052 for Phosphorus Content. Analysis was performed by ICP-AES.	10	115	-
六溴環十二烷及所有主要被辨別出的異構物 / Hexabromocyclododecane (HBCDD) and all major diastereoisomers identified (α-HBCDD, β- HBCDD, γ- HBCDD) (CAS No.: 25637-99-4 and 3194-55-6 (134237-51-7, 134237-50-6, 134237-52-8))	mg/kg	參考IEC 62321: 2008方法，以氣相層析/質譜儀檢測. / With reference to IEC 62321: 2008 method. Analysis was performed by GC/MS.	5	n.d.	-
四溴雙酚-A / Tetrabromobisphenol A (TBBP-A) (CAS No.: 79-94-7)	mg/kg	參考RSTS-E&E-121方法，以液相層析/質譜儀分析. / With reference to RSTS-E&E-121. Analysis was performed by LC/MS.	10	n.d.	-

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測極限值 (MDL)	結果 (Result) No.1	限值 (Limit)
紅磷 / Red phosphorus	**	本測試以熱裂解-氣相層析/質譜儀分析. / Analysis was performed by Pyrolyzer-GC/MS.	-	Negative	-
聚氯乙烯 / PVC	**	以紅外光譜分析及焰色法檢測. / Analysis was performed by FTIR and FLAME Test.	-	Negative	-
全氟辛酸(銨) / PFOA (CAS No.: 335-67-1)	mg/kg	參考US EPA 3550C: 2007方法, 以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.	-
全氟辛烷磺酸 / Perfluorooctane sulfonates (PFOS)	mg/kg	參考US EPA 3550C: 2007方法, 以液相層析/質譜儀檢測. / With reference to US EPA 3550C: 2007. Analysis was performed by LC/MS.	10	n.d.	-
鹵素 / Halogen					
鹵素 (氟) / Halogen-Fluorine (F) (CAS No.: 014762-94-8)	mg/kg	參考BS EN 14582:2016，以離子層析儀分析. / With reference to BS EN 14582:2016. Analysis was performed by IC.	50	n.d.	-
鹵素 (氯) / Halogen-Chlorine (Cl) (CAS No.: 022537-15-1)	mg/kg		50	104	-
鹵素 (溴) / Halogen-Bromine (Br) (CAS No.: 010097-32-2)	mg/kg		50	n.d.	-
鹵素 (碘) / Halogen-Iodine (I) (CAS No.: 014362-44-8)	mg/kg		50	n.d.	-

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測試項目 (Test Items)	單位 (Unit)	測試方法 (Method)	方法偵測極限值 (MDL)	結果 (Result) No.1	限值 (Limit)
多環芳香烴 / Polynuclear Aromatic Hydrocarbons (PAHs)					
苊 / Acenaphthene (CAS No.: 83-32-9)	mg/kg	參考AfPS GS 2014:01 PAK方法，以氣相層析/質譜儀檢測. / With reference to AfPS GS 2014:01 PAK method. Analysis was performed by GC/MS.	0.2	n.d.	-
苊烯 / Acenaphthylene (CAS No.: 208-96-8)	mg/kg		0.2	n.d.	-
蒽 / Anthracene (CAS No.: 120-12-7)	mg/kg		0.2	n.d.	-
苯駢蒽 / Benzo[a]anthracene (CAS No.: 56-55-3)	mg/kg		0.2	n.d.	-
苯駢(a)芘 / Benzo[a]pyrene (CAS No.: 50-32-8)	mg/kg		0.2	n.d.	-
苯(b)苯駢芴 / Benzo[b]fluoranthene (CAS No.: 205-99-2)	mg/kg		0.2	n.d.	-
苯駢苝 / Benzo[g,h,i]perylene (CAS No.: 191-24-2)	mg/kg		0.2	n.d.	-
苯(k)苯駢芴 / Benzo[k]fluoranthene (CAS No.: 207-08-9)	mg/kg		0.2	n.d.	-
Chrysene (CAS No.: 218-01-9)	mg/kg		0.2	n.d.	-
二苯駢蒽 / Dibenzo[a,h]anthracene (CAS No.: 53-70-3)	mg/kg		0.2	n.d.	-
苯駢芴 / Fluoranthene (CAS No.: 206-44-0)	mg/kg		0.2	n.d.	-
芴 / Fluorene (CAS No.: 86-73-7)	mg/kg		0.2	n.d.	-
茚酮芘 / Indeno[1,2,3-c,d] pyrene (CAS No.: 193-39-5)	mg/kg		0.2	n.d.	-
萘 / Naphthalene (CAS No.: 91-20-3)	mg/kg		0.2	n.d.	-
菲 / Phenanthrene (CAS No.: 85-01-8)	mg/kg		0.2	n.d.	-
芘 / Pyrene (CAS No.: 129-00-0)	mg/kg		0.2	n.d.	-
苯(j)苯駢芴 / Benzo[j]fluoranthene (CAS No.: 205-82-3)	mg/kg		0.2	n.d.	-
苯駢(e)芘 / Benzo[e]pyrene (CAS No.: 192-97-2)	mg/kg		0.2	n.d.	-
多環芳香烴18項總和 / Sum of 18 PAHs	mg/kg		-	n.d.	-

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備註(Note)：

1. mg/kg = ppm；0.1wt% = 1000ppm
2. n.d. = Not Detected (未檢出)
3. MDL = Method Detection Limit (方法偵測極限值)
4. "-" = Not Regulated (無規格值)
5. **= Qualitative analysis (No Unit) 定性分析(無單位)
6. Negative = Undetectable 陰性(未偵測到); Positive = Detectable 陽性(已偵測到)
7. 聚氯乙烯測試由SGS其他實驗室執行 (The PVC test was subcontracted to other SGS Laboratory.)
8. 紅磷定性分析測試由SGS其他實驗室執行
   (The Red Phosphorus test was subcontracted to other SGS Laboratory.)

PFOS參考資訊(Reference Information) : 持久性有機污染物 POPs - (EU) 757/2010

PFOS濃度在物質或製備中不得超過0.001%(10ppm)，在半成品、成品或零部件中不得超過0.1%(1000ppm)，在紡織品或塗層材料中不得超過1μg/m^2。(Outlawing PFOS as substances or preparations in concentrations above 0.001% (10ppm), in semi-finished products or articles or parts at a level above 0.1%(1000ppm), in textiles or other coated materials above 1μg/m^2.)

全氟辛烷磺酸指全氟辛烷磺酸和它的衍生物包括全氟辛烷磺酸, 全氟辛基磺醯胺, N-甲基全氟辛烷磺酰胺, N-乙基全氟辛烷磺酰胺, N-甲基全氟辛基磺酰基氨基乙醇, N-乙基全氟辛基磺酰基氨基乙醇。(PFOS refer to Perfluorooctanesulfonic acid and its derivatives including Perfluorooctanesulfonic acid, Perfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamide, N-Ethylperfluoroctane sulfonamide, N-Methylperfluoroctane sulfonamidoethanol and N-Ethylperfluoroctane sulfonamidoethanol.)

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德國產品安全委員會(AfPS) GS PAHs 要求 /
AfPS (German commission for Product Safety): GS PAHs requirements

項目 (Parameter)	第1類 (Category 1)	第2類 (Category 2)		第3類 (Category 3)	
	意圖放入嘴內的材料或玩具會與皮膚有所接觸(超過30秒). (Material indented to be put in the mouth or toys with intended skin contact (longer than 30 s).)	不屬於第1類的材料並可預見與皮膚接觸逾30秒(長期或經常與皮膚接觸). (Materials not falling under category 1 with foreseeable contact to skin for longer than 30 seconds (long-term skin or frequent contact).)		可預見與皮膚接觸短於30秒(短期與皮膚接觸), 以及不屬於第1類或第2類的材料. (Materials not falling under category 1 or 2 with foreseeable contact to skin for less than 30 seconds (short-term skin contact).)	
		列於2009/48/EC之玩具 (Toy under 2009/48/EC)	列於德國產品安全法之其他產品 (Other products under ProdSG)	列於2009/48/EC之玩具 (Toy under 2009/48/EC)	列於德國產品安全法之其他產品 (Other products under ProdSG)
Naphthalene	< 1	< 2		< 10	
Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene	< 1 Sum	< 5 Sum	< 10 Sum	< 20 Sum	< 50 Sum
Benzo[a]anthracene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Chrysene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[b]fluoranthene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[j]fluoranthene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[k]fluoranthene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[a]pyrene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[e]pyrene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Indeno[1,2,3-c,d] pyrene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Dibenzo[a,h]anthracene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
Benzo[g,h,i]perylene	< 0.2	< 0.2	< 0.5	< 0.5	< 1
18項PAH總濃度 (Sum of 18 PAH)	< 1	< 5	< 10	< 20	< 50

試驗報告

Test Report

義典科技股份有限公司
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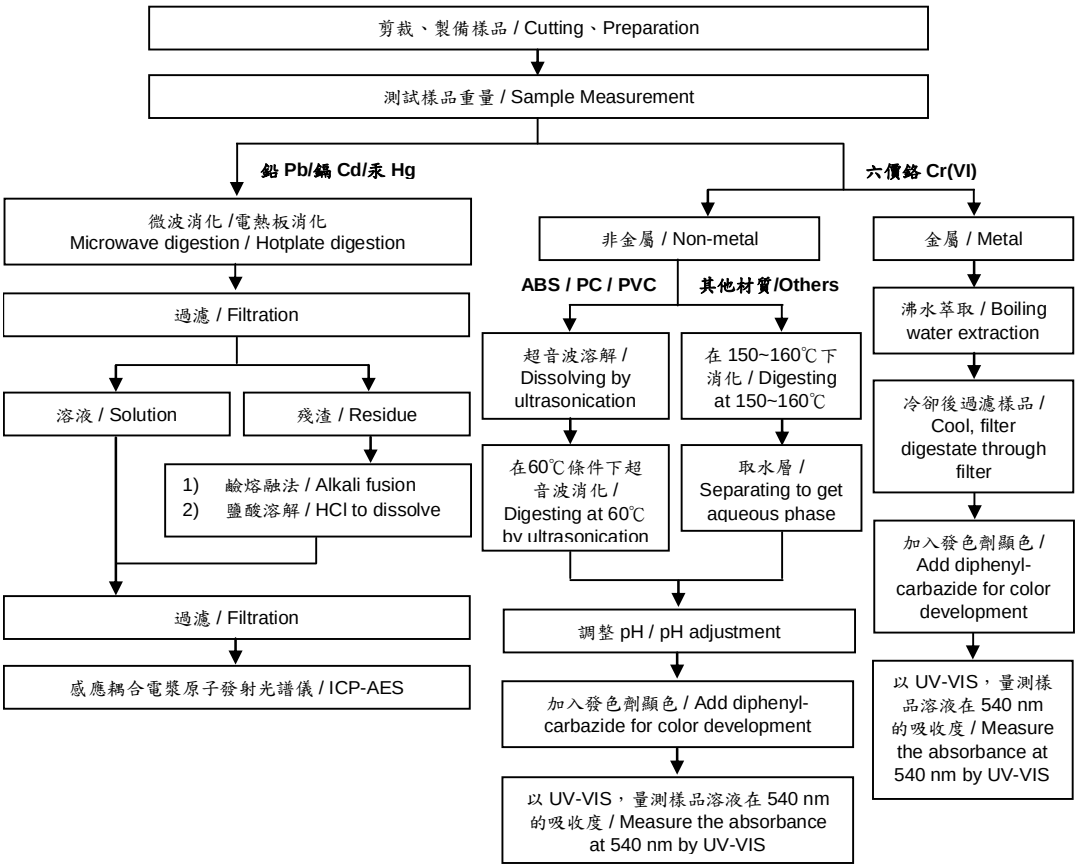
重金屬流程圖 / Analytical flow chart of Heavy Metal

根據以下的流程圖之條件，樣品已完全溶解。（六價鉻測試方法除外）
These samples were dissolved totally by pre-conditioning method according to below flow chart.（Cr^{6+} test method excluded）

- 測試人員：劉俊宏/ Technician : Jony Liu
- 測試負責人：張伯睿/ Supervisor: Ray Chang



試驗報告

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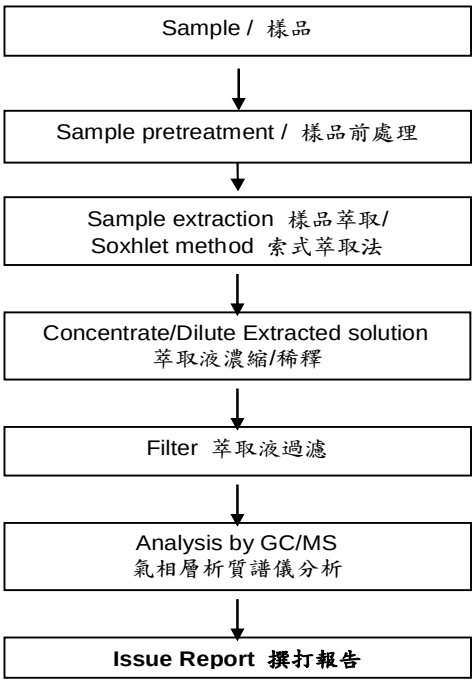
多溴聯苯/多溴聯苯醚 分析流程圖 / PBB/PBDE analytical FLOW CHART

1)測試人員：陳威錚 / Name of the person who made measurement: Dorothy Chen
2)測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



試驗報告

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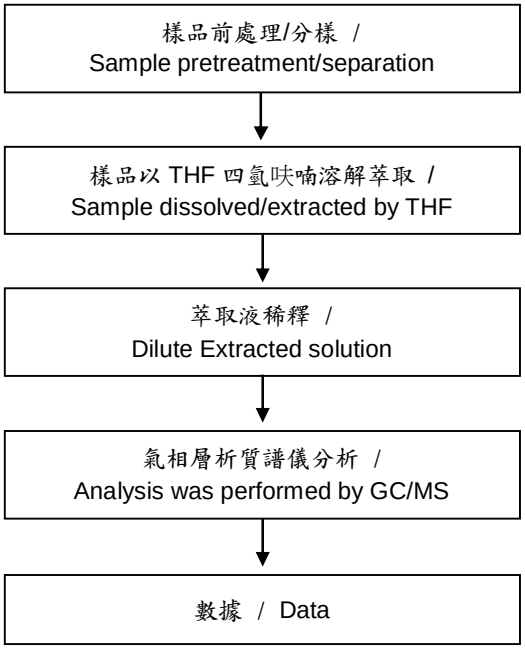
可塑劑分析流程圖 / Analytical flow chart of phthalate content

- 測試人員：陳威錚 / Name of the person who made measurement: Dorothy Chen
- 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang

【測試方法/Test method: IEC 62321-8】



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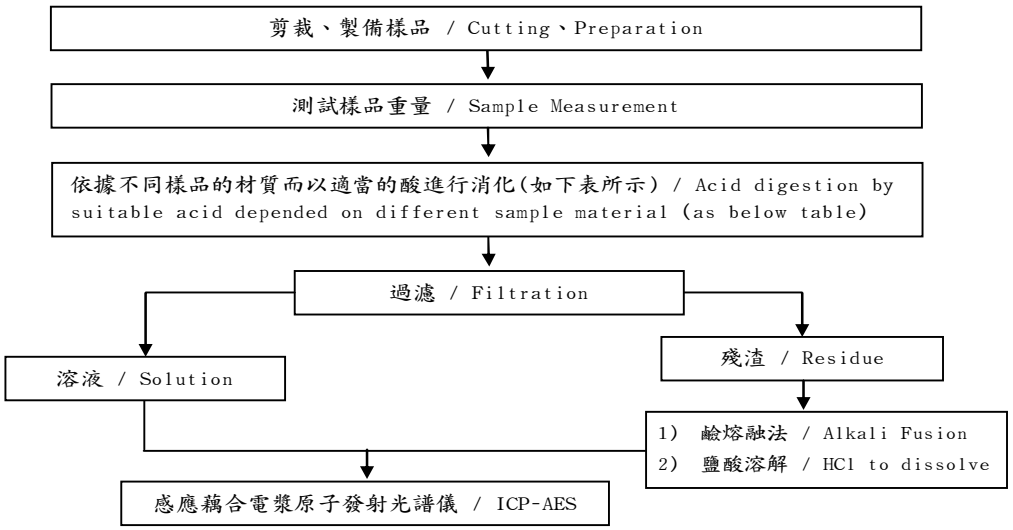
1) 根據以下的流程圖之條件，樣品已完全溶解。 / These samples were dissolved totally by pre-conditioning method according to below flow chart.
2) 測試人員：劉俊宏 / Name of the person who made measurement: Jony Liu
3) 測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang

元素以 ICP-AES 分析的消化流程圖

(Flow Chart of digestion for the elements analysis performed by ICP-AES)



鋼,銅,鋁,焊錫 / Steel, copper, aluminum, solder	王水,硝酸,鹽酸,氫氟酸,雙氧水 / Aqua regia, HNO_3, HCl, HF, H_2O_2
玻璃 / Glass	硝酸,氫氟酸 / HNO_3/HF
金,鉑,鈀,陶瓷 / Gold, platinum, palladium, ceramic	王水 / Aqua regia
銀 / Silver	硝酸 / HNO_3
塑膠 / Plastic	硫酸,雙氧水,硝酸,鹽酸 / H_2SO_4, H_2O_2, HNO_3, HCl
其他 / Others	加入任何酸至完全溶解 / Any acid to total digestion

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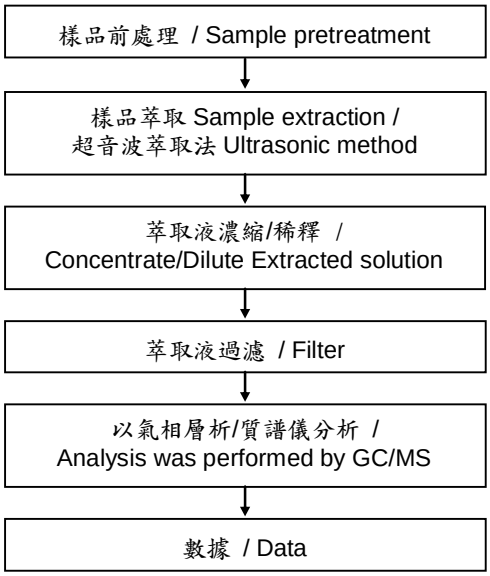
六溴環十二烷分析流程圖 / HBCDD analytical flow chart

1) 測試人員：陳威錚/ Name of the person who made measurement: Dorothy Chen
2) 測試負責人：張伯睿/ Name of the person in charge of measurement: Ray Chang



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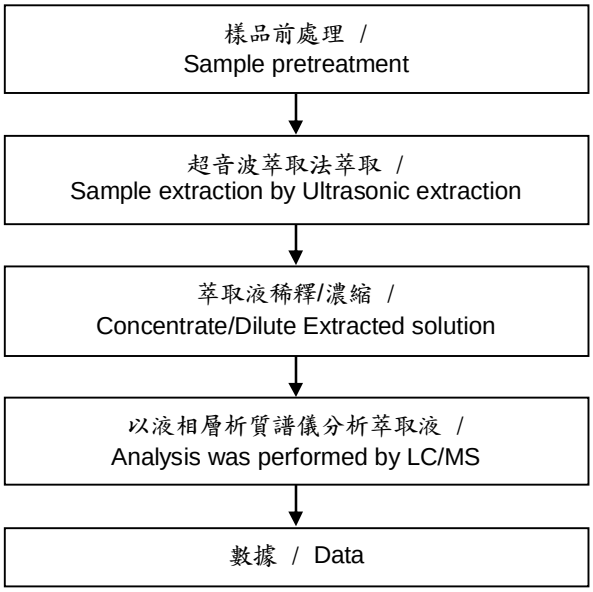
四溴雙酚-A分析流程圖 / TBBP-A analytical flow chart

- 測試人員：黃璟瓔/ Name of the person who made measurement: Ginny Huang
- 測試負責人：張伯睿/ Name of the person in charge of measurement: Ray Chang



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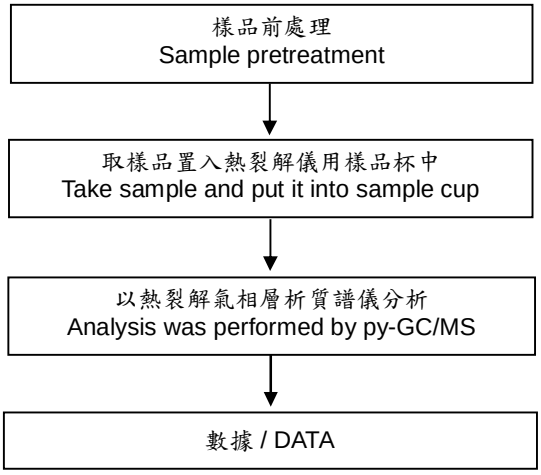
紅磷分析流程 / Analytical flow chart of Red phosphorus

- 測試人員：林建宇 / Name of the person who made measurement: Roy Lin
- 測試負責人：張啟興 / Name of the person in charge of measurement: Troy Chang



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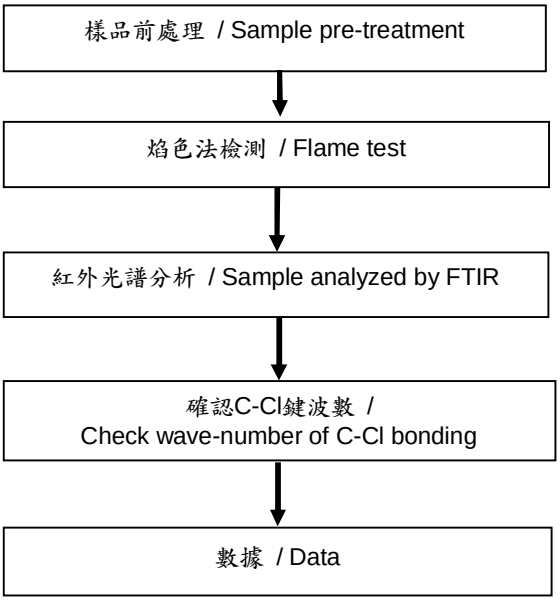
聚氯乙烯物質判定分析流程圖 /

Analysis flow chart for determination of PVC in material

1)測試人員：戴秀純 / Name of the person who made measurement: Hannah Tai
2)測試負責人：林立翔 / Name of the person in charge of measurement: Roger Lin



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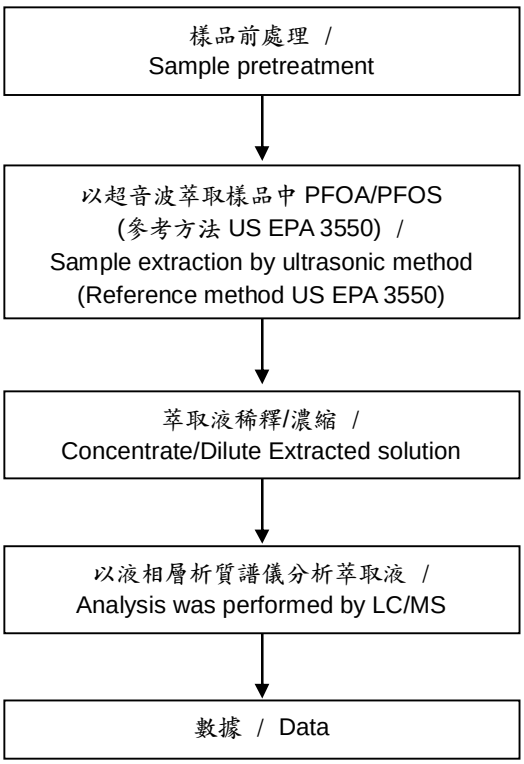
全氟辛酸(銨)/ 全氟辛烷磺酸分析流程圖 /
Analytical flow chart of PFOA/PFOS content

1)測試人員：黃璟瓔 / Name of the person who made measurement: Ginny Huang

2)測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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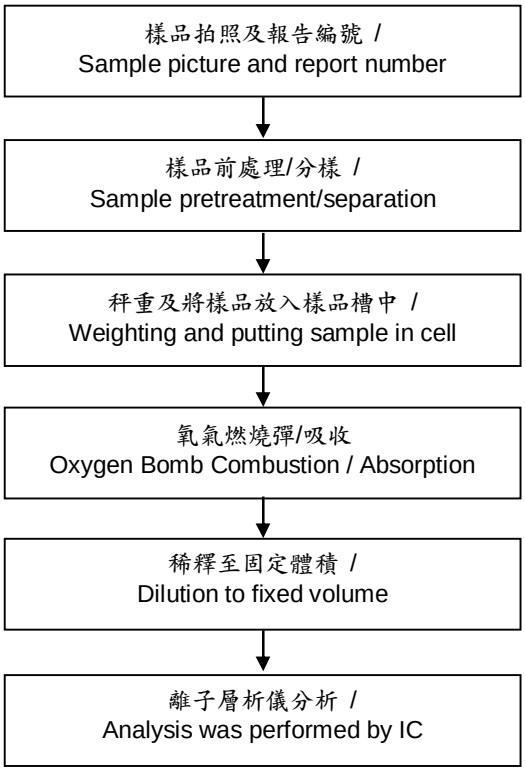
鹵素分析流程圖 / Analytical flow chart of halogen content

1) 測試人員：洪秀眞/ Name of the person who made measurement: Jean Hung
2) 測試負責人：張伯睿/ Name of the person in charge of measurement: Ray Chang



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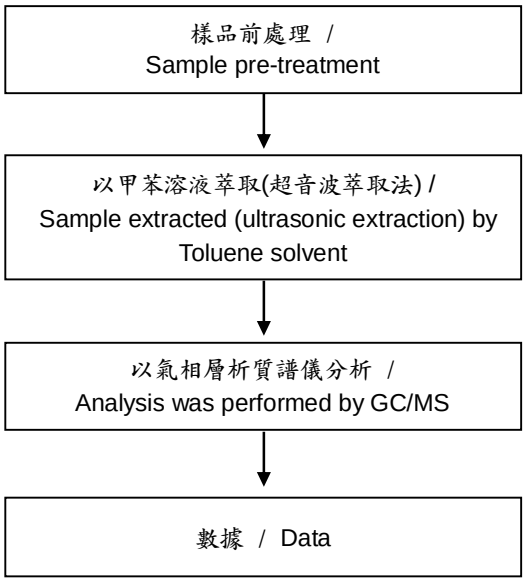
多苯環芳香族化合物分析流程圖 /
PAHs (Poly Aromatic Hydrocarbons) analytical flow chart

1)測試人員：陳威錚 / Name of the person who made measurement: Dorothy Chen

2)測試負責人：張伯睿 / Name of the person in charge of measurement: Ray Chang



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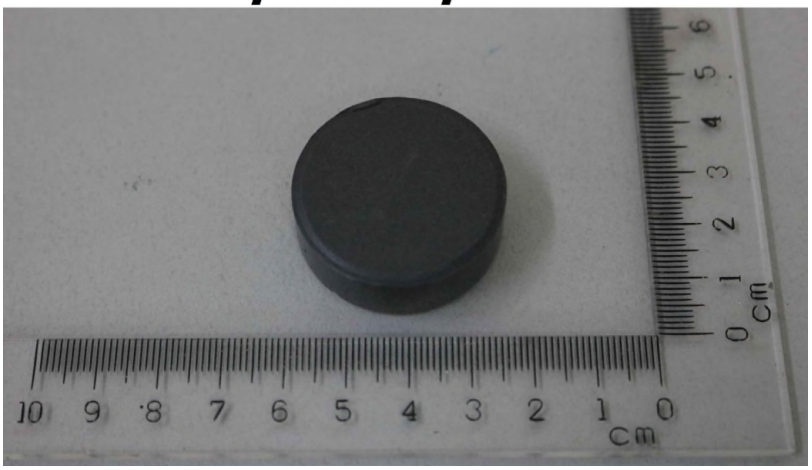
*** 照片中如有箭頭標示，則表示爲實際檢測之樣品/部位. ***
(The tested sample / part is marked by an arrow if it's shown on the photo.)

KA/2017/61160



** 報告結尾 (End of Report) **